

Degenerative Osteoarthritis



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Topics to Cover

- Definition
- Patho-anatomy
- Types:
 - Primary
 - Secondary
- Grades
- Clinical picture
- Workup
- Treatment
 - Conservative
 - Minimally invasive
 - Operative
- Complications

Introduction to O.A

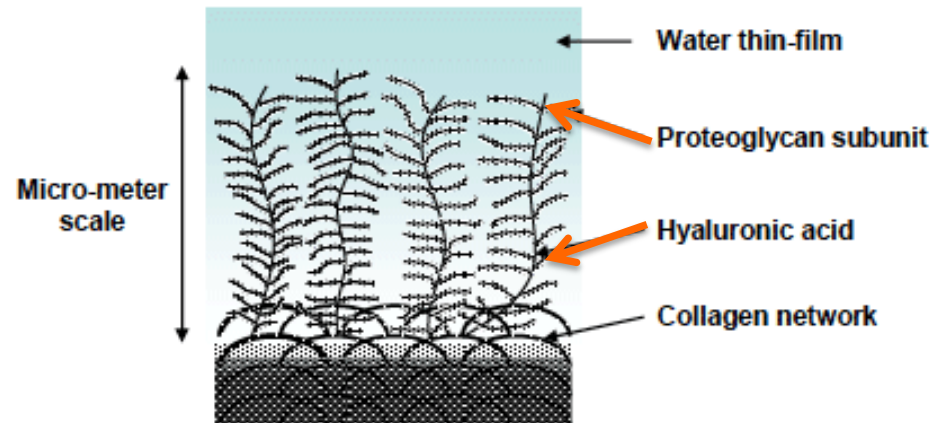
O.A

Progressive disintegration (loss)
of articular cartilage in synovial joints

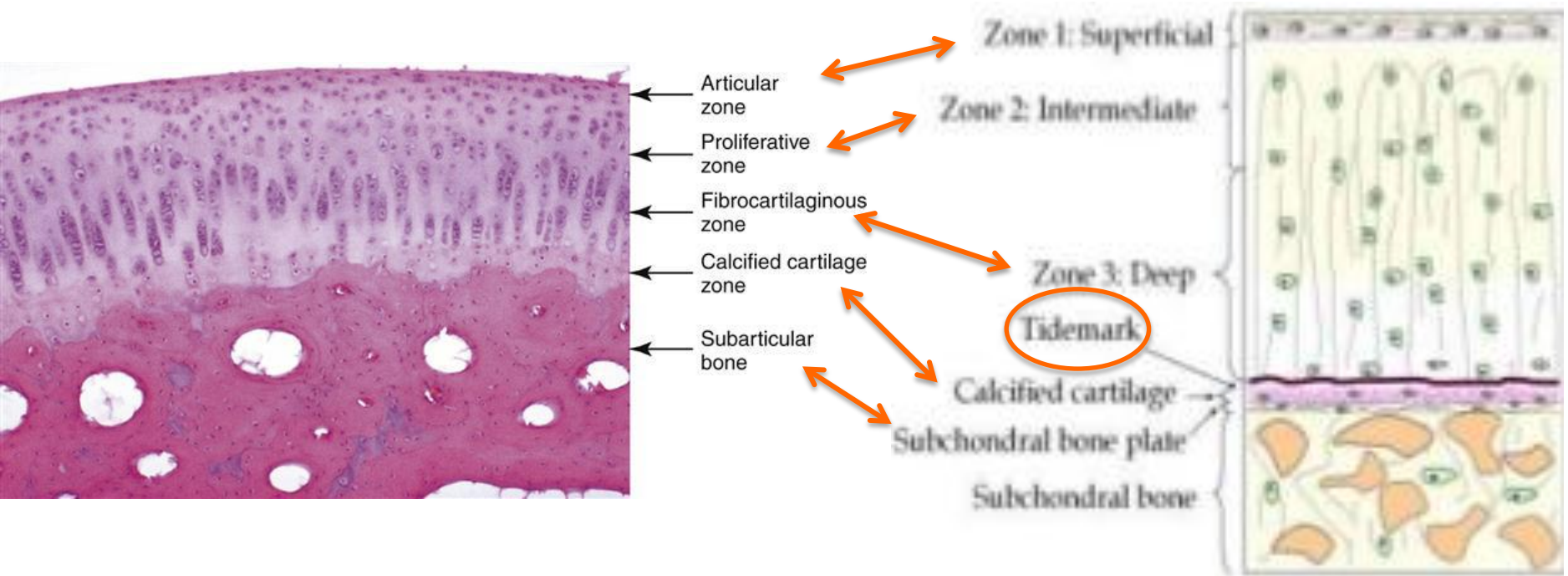
Articular Cartilage

- Histology:
 - 1) Chondrocytes (low in number & poor proliferation capacity)
 - 2) Matrix (gel-like, high water content 60-80%):
 - a. Glycoaminoglycans
 - b. Proteoglycans (gives stiffness & springiness, is hydrophilic)
 - c. Collagen (type-II)
- It is avascular
- Low self-regeneration

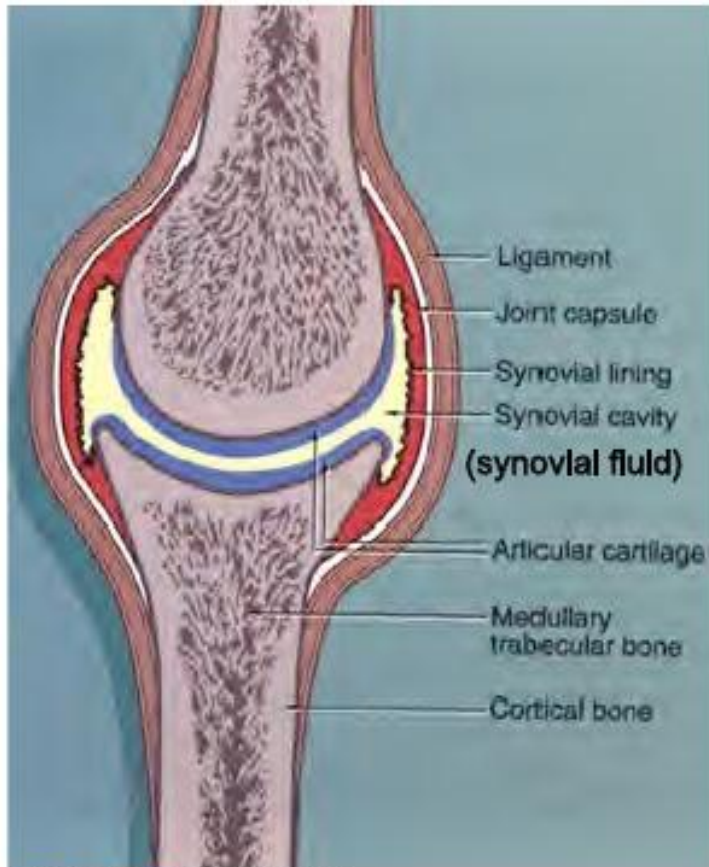
(a) Cartilage



Articular Cartilage



Articular Cartilage



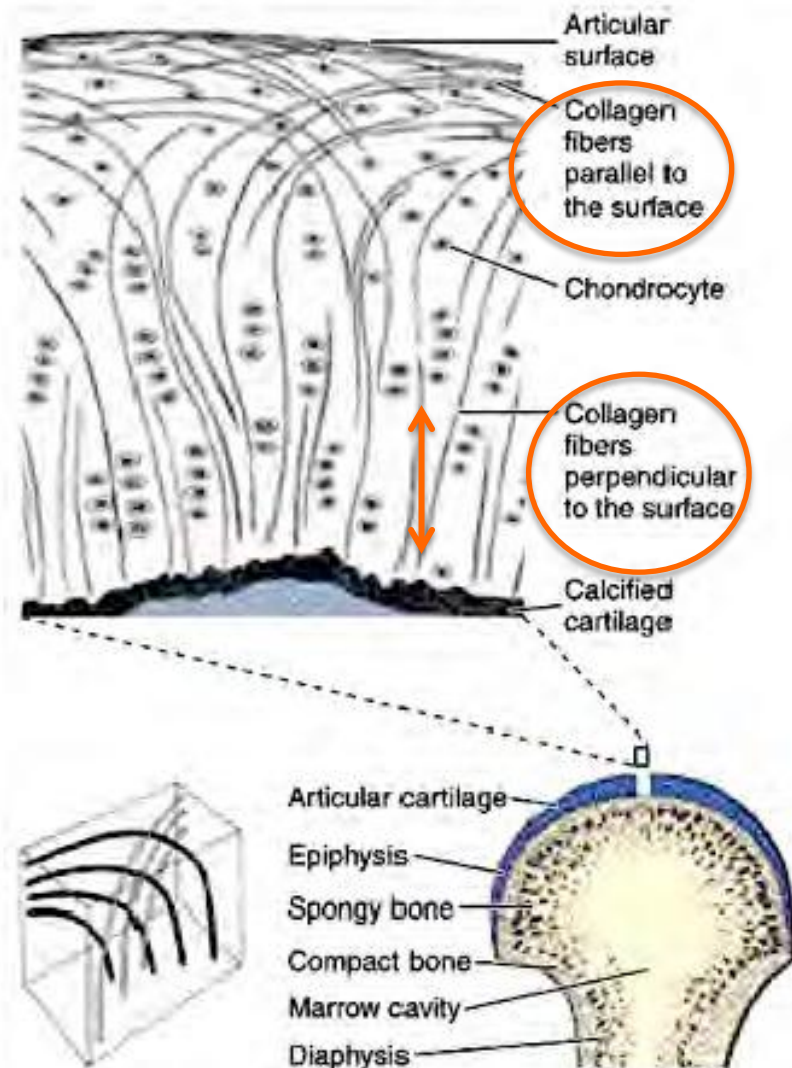
PD-INEL Wheater p. 202

Bathed in synovial fluid.

No perichondrium

Collagen fibers - arranged as gothic arches

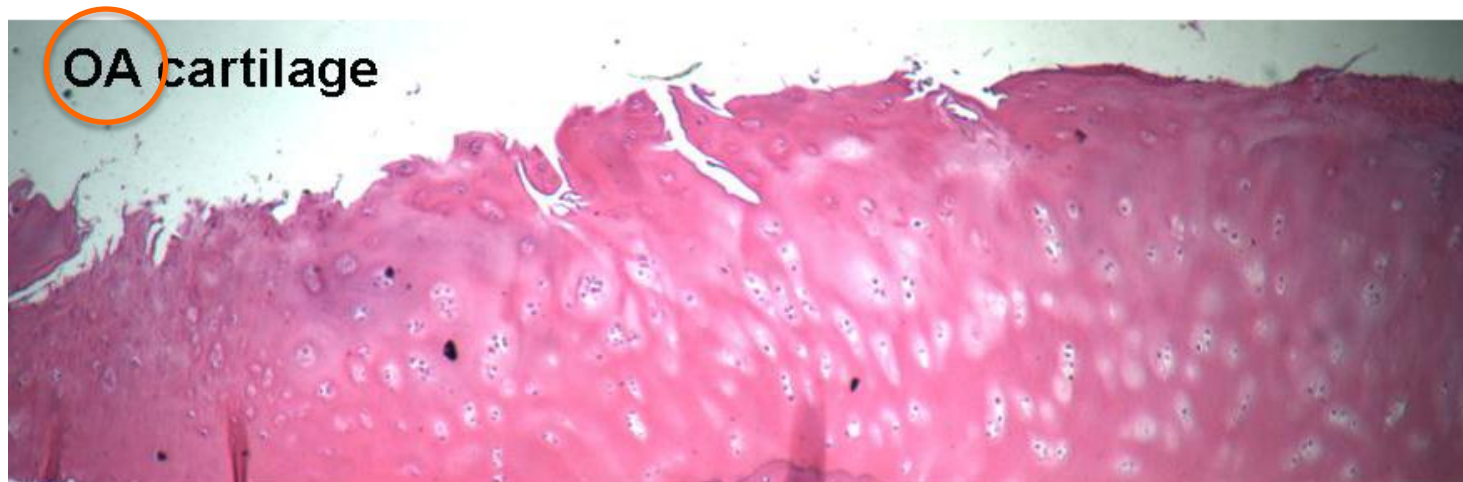
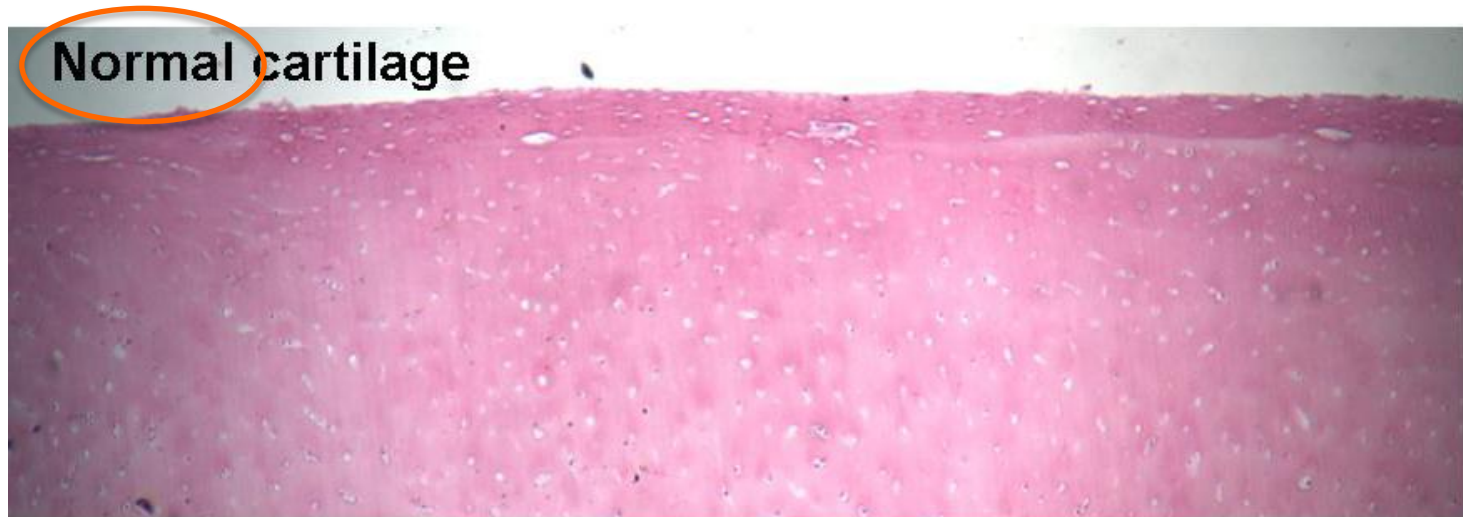
Chondrocytes - in vertical rows.



PD-INEL Junqueira, p.157

Articular Cartilage

Histology of Human Normal and Osteoarthritic Cartilage



Types of O.A

Types

- Primary (no obvious factor)
- Secondary (has a cause)

Primary O.A

O.A

- In elderly
- M=F
- In ladies → more joints affected
- Commonest disorder of all joint diseases
- We have it more than the West ...
- If a person lives long enough he/she will develop O.A
- We start aging (tissues) process by...

O.A

- Though it's a degenerative condition, but may have symptoms & signs of inflammation
- It may have → flairs & remissions
- Joints:
 - Hip
 - Knee
 - Fingers
 - Spine
 - Elbow
 - Wrist
 - Ankle

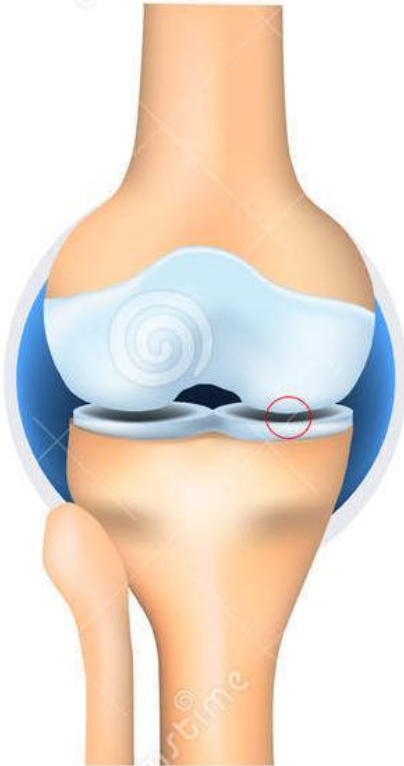
O.A

- Causes of pain:
 - Synovial inflammation
 - Muscular fatigue
 - Bone pressure (vascular congestion & interosseous hypertension)
 - Stiff joint (capsular fibrosis)

Grades of O.A

O.A Grading

I
Doubtful



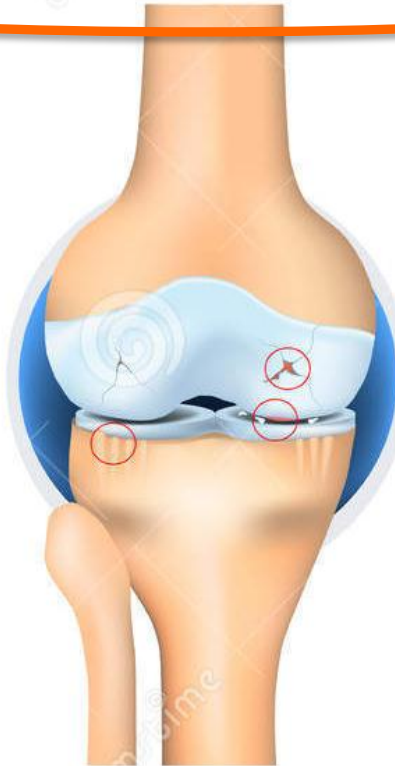
Minimum disruption.
There is already
10% cartilage loss.

II
Mild



Joint-space narrowing.
The cartilage to begin breaking down.
Occurrence of osteophytes.

III
Moderate



Moderate joint-space reduction.
Gaps in the cartilage can
expand until they reach the bone.

IV
Severe



Joint-space greatly reduced.
60% of the cartilage is already lost.
Large osteophytes.



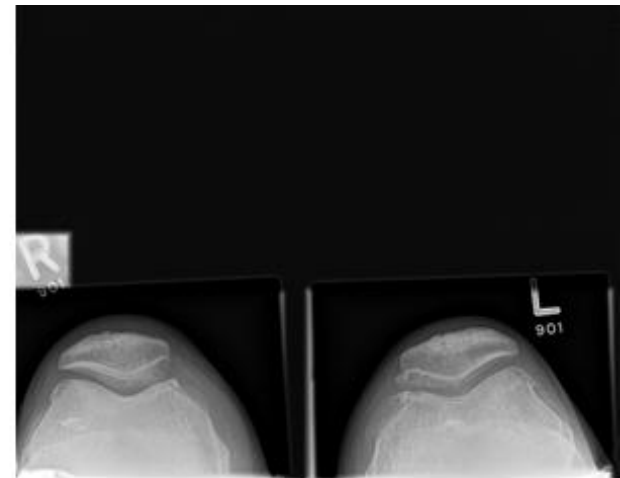
O.A- Mild

- Joint space → mild narrowing
- Sub-chondral → sclerosis



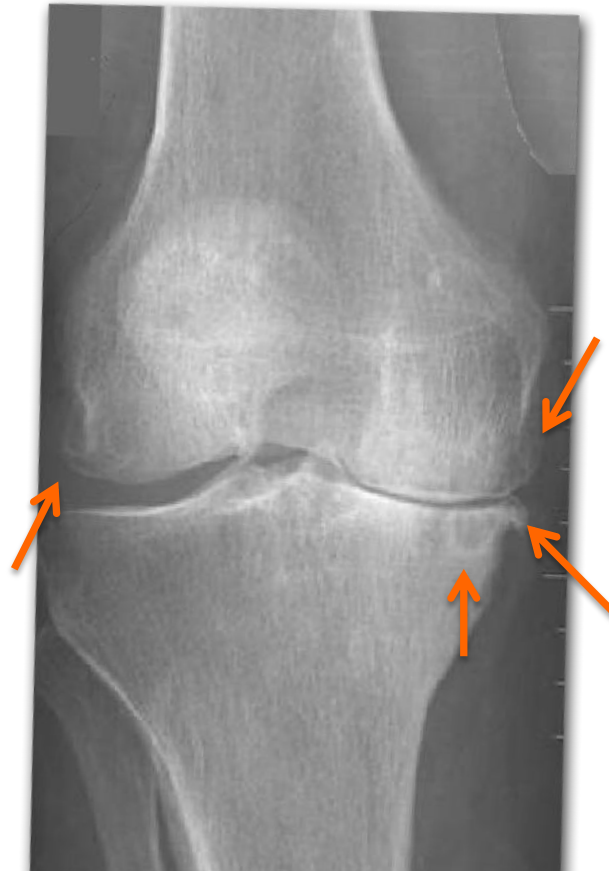
O.A- Moderate

- Joint space → decreased significantly
- Sub-chondral → cysts
- Osteophytes



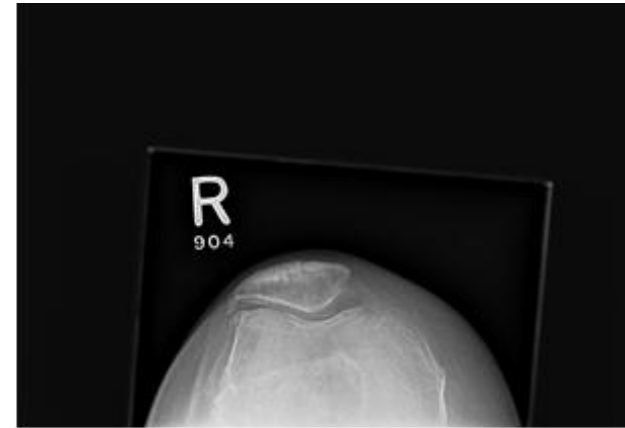
O.A- Moderate

- Joint space → decreased significantly
- Sub-chondral → cysts
- Osteophytes at margins



O.A- Severe

- Joint space → bone-on-bone
- Joint subluxation



O.A- Severe

- Joint space → bone-on-bone
- Loose bodies



Clinical Picture

O.A- Symptoms

- Pain:
 - Local to the affected joint
 - Or referred...
 - Started → insidiously, for m's or y's
 - ↑ with activity, prolonged (stand, sit, cock, ...)
 - ↓ with: rest, analgesia, with time to relieved fully
 - Worse at end of day
 - How sleep at night
- Stiff joints:
 - Characteristic after periods on inactivity
 - With time → progressive & constant

O.A- Symptoms

- Joint(s) swelling:
 - Intermittent → effusion (flares & remissions)
 - Constant → thick capsule, osteophytes
- Deformity:
 - Due → abnormal weight loads
 - Make sure its not the cause of O.A
- Limping
- Affection of daily activity (in & out of home)
- Walking distance
- Using stairs
- Walking aid



O.A- Symptoms

- How prays
- Type of bathroom
- Response to analgesia
- Treatment (any)
- PMH
- PSH

O.A- Signs

- Look:
 - Swollen (mild – moderate)
 - Deformity → genu varus (may be valgus)
- Feel:
 - Tender joint lines
 - May warm skin
- ↓ ROM:
 - not in all directions
 - Pain at end of motion
 - Crepitation

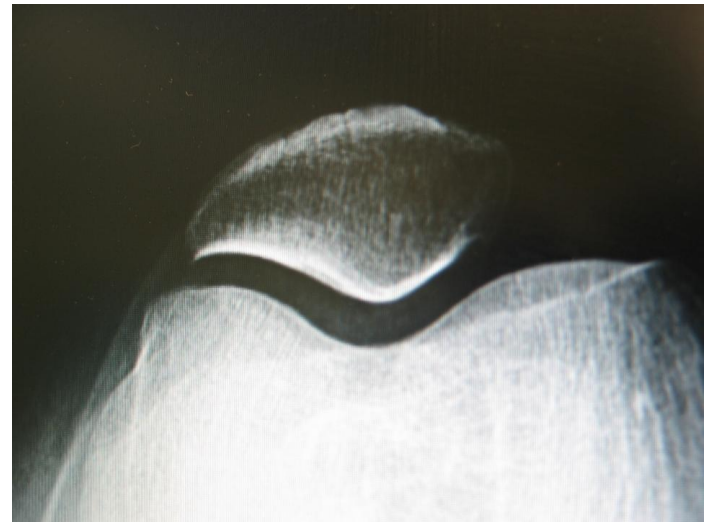
O.A- Signs

- Special tests:
 - Overstretched lateral collateral ligament
 - Tight medial collateral ligament
 - Instability, may be due:
 - Loss of cartilage,
 - Asymmetrical capsular contractures,
 - Muscle weakness,
 - Torn ACL
 - Joint effusion (mild)
- Must assess other joints
- N.V examination

O.A Workup

O.A- Workup

- Bloods → general health
- Swabs (nose, axilla, groin) → to R/O infection pre.op
- Urine analysis & C/S → infection & tumor
- XR's:
 - Bil AP standing
 - Lat supine
 - Patellar sky-line



O.A- Radiology

- ↓ joint space (medial > Lat)
- Sub-chondral:
 - Sclerosis
 - Cysts
- Osteophytes at margins
- Loose bodies
- Subluxation
- Look for other disorders that might caused O.A



O.A- Radiology

- We rarely need more
- CT & MRI if need more info pre op

Treatment

O.A- Treatment

- Aim:
 - Maintain joints movement
 - Maintain muscle strength
 - Protect the joint from over load
 - Relive pain
 - Modify daily activities
- **Not** all pt's with O.A need surgery

O.A- Treatment

- Conservative:
 - P.T
 - Massage
 - Warm/Cold compression
 - Load reduction
 - Analgesia
 - Modify daily activities
 - Injections
- Minimally invasive:
 - Arthroscopy
- Operative:
 - Corrective osteotomy
 - Hemi-arthroplasty
 - Total arthroplasty
 - Arthrodesis

Conservative

O.A- Treatment → conservative

- “Keep moving”
- P.T:
 - Maintain joint & muscle
 - Avoid impact loading
- Massage
- Warm/Cold compressions
- Load reduction:
 - Weight of patient → dietitian, or bariatric surgeon
 - Knee hinged braces
 - Walking aid → cane, crutch, or walker



O.A- Treatment → conservative

- Analgesia:
 - PRN → oral & local gels
 - Care if pt. has PUD
- “Glucosamine” tablets → beneficial if early
- Modify daily activities:
 - At home
 - At work

O.A- Treatment → conservative

- Injections:

- Hyaluronic acid:

- Only in grade-I, may be early grade-II
 - Either:
 - 3 injections per knee, Q1w, each in a compartment, or
 - 1 injection stat
 - Results vary:
 - 1/3 → improve a lot, for months
 - 1/3 → improve for weeks only
 - 1/3 → vary temporary improvement in pain

- Steroid:

- Advanced cases waiting surgery
 - Patients unfit for surgery

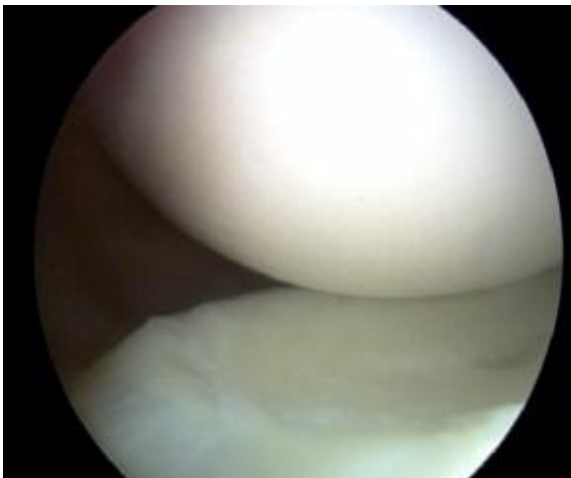
- Stem cell → still in research period



Minimally Invasive

O.A- Treatment → minimally invasive

- Arthroscopy:
 - Diagnostic, &
 - Therapeutic:
 - Shavings
 - R/O loose bodies



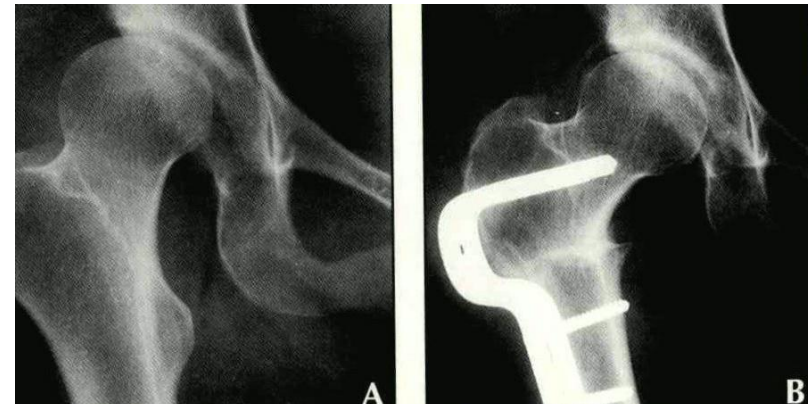
Operative

O.A- Treatment → operative

- When do we operate?
 - We book for surgery when the pt. asks for it
 - “We operate on pt’s not XR’s”
 - Failure of conservative
 - Sever O.A
 - Joint instability

O.A- Treatment → operative

- Corrective osteotomy:
 - Done in:
 - Young pt., with
 - Proximal tibia or femur vara or valga
 - Early stages
 - Stable & mobile joints
 - Knee → High Tibial Osteotomy (HTO)
 - Hip → proximal femoral (varus or valgus) corrective osteotomy

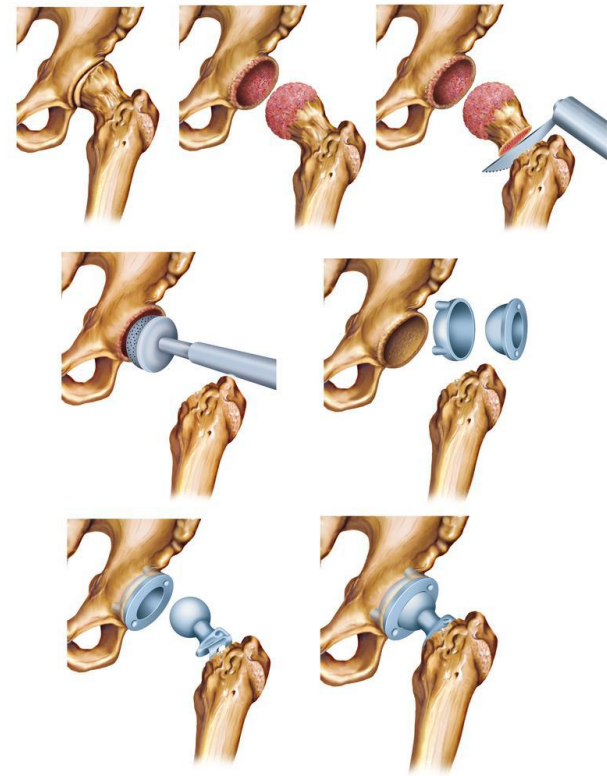


O.A- Treatment → operative

- Corrective osteotomy:
 - Benefit:
 - Distributing the weight load on articular surfaces
 - Vascular decompression of subchondral bone
 - To keep their own joint
 - Helps in delaying (TKR or THR) for years

O.A- Treatment → operative

- Hemi arthroplasty:
 - Knee → uni-compartment replacement
 - Hip → either a femoral head or acetabular part
 - Also delays TKR & THR



O.A- Treatment → operative



O.A- Treatment → operative

- TKR & THR → Proper pt. selection, **not** done on:
 - Young pt.
 - Non-walker >2y → loss of quads function
 - Stiff joint
 - Contralateral limb disease
 - Neurological pt.
 - Psychiatric pt.
 - Vary low 5y survival in tumor pt.
 - Chronic infection
 - If on immunosuppressive medications for life (relative)



O.A- Treatment → operative

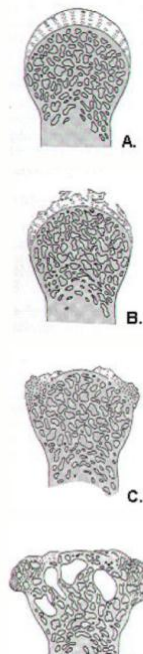
- TKR & THR:
 - When done properly → lasts 10-15y
 - Must do aggressive post op P.T
 - Implant coast...

O.A- Treatment → operative

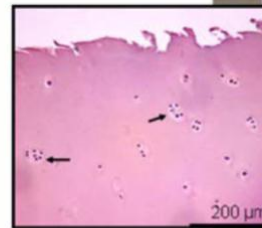
- Arthrodesis:
 - Valid mainly for small joints of:
 - Hand → carpal bones
 - Foot → tarsal or 1st MPJ bones
 - Ankle
 - Subtalar
 - Spine
 - To:
 - To shift the painful stiff joint to a painless one
 - Improve stability
 - No proper implant for it

O.A- Treatment → operative

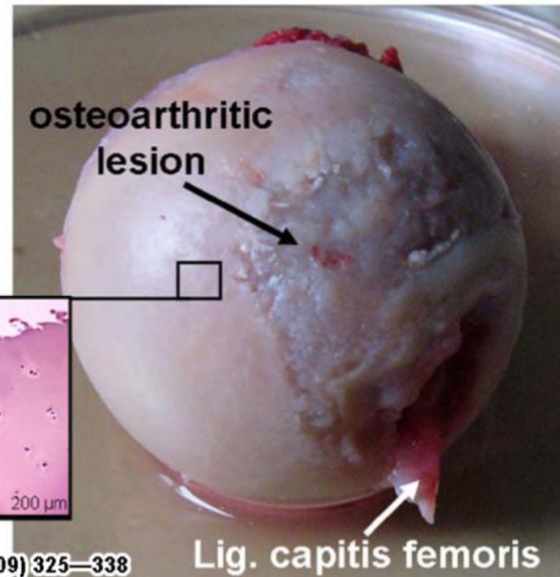
Osteoarthritis (OA):
joint disease with loss of articular cartilage



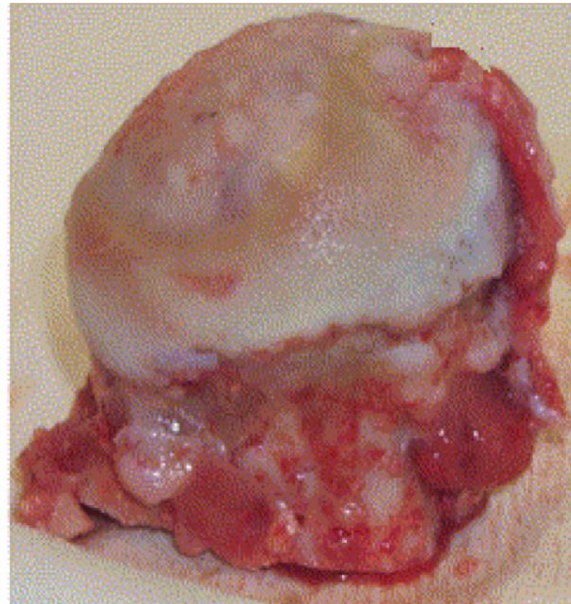
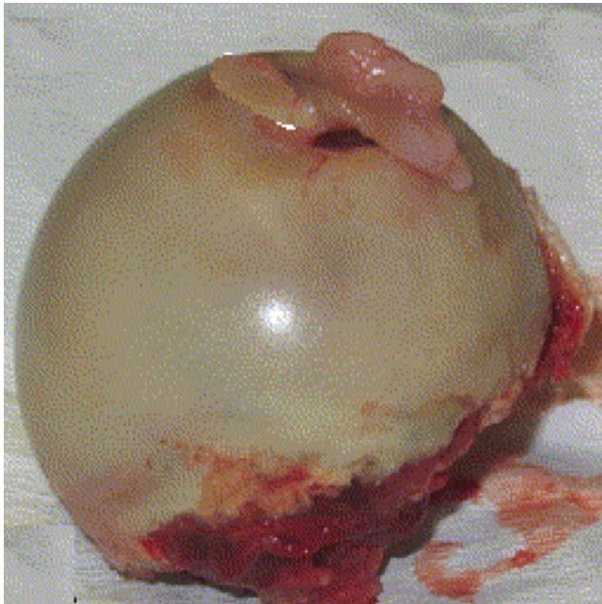
Erosion of articular cartilage reduces joint function; leads to bone remodeling, pain, and loss of activity



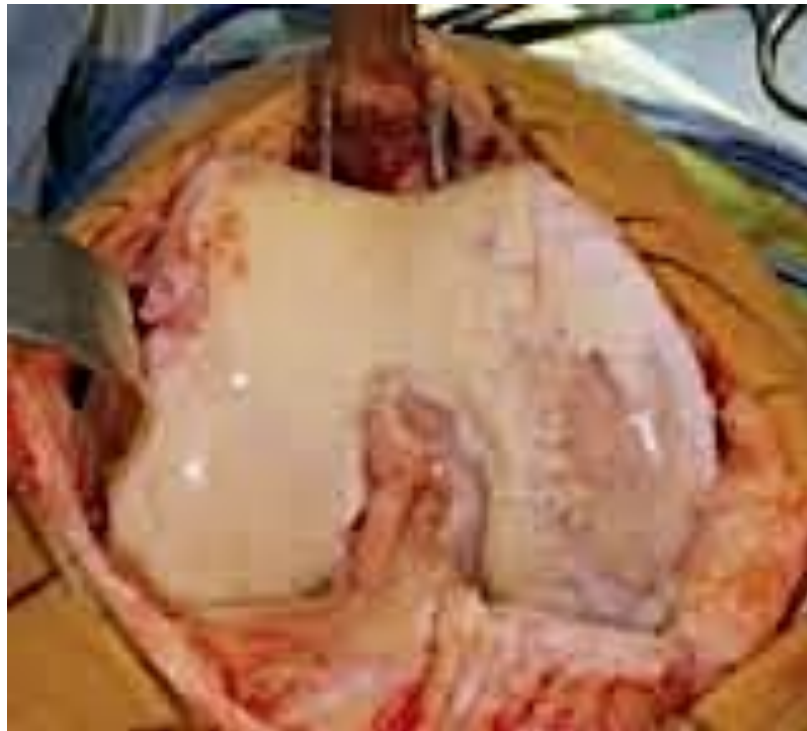
Ann Anat 191 (2009) 325–338



O.A- Treatment → operative



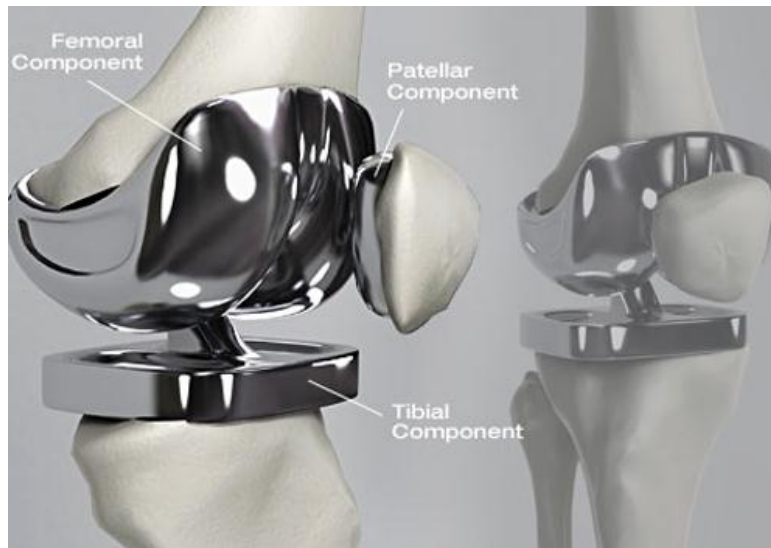
O.A- Treatment → operative



O.A- Treatment → operative



O.A- Treatment → operative



O.A- Treatment → operative



Complications

O.A- Complications

- Wound → infection, dehiscence
- DVT, P.E
- Implant:
 - Deep infection
 - Aseptic loosening
 - Peri-prostatic #
 - Implant # (brake)
 - Subluxation
 - Dislocation
- Need for revision arthroplasty

O.A- Complications, Post op Infection



O.A- Complications, Loosening



O.A- Complications, Loosening



O.A- Complications, Loosening



O.A- Complications, Peri-prosthetic



Fig. 4-A

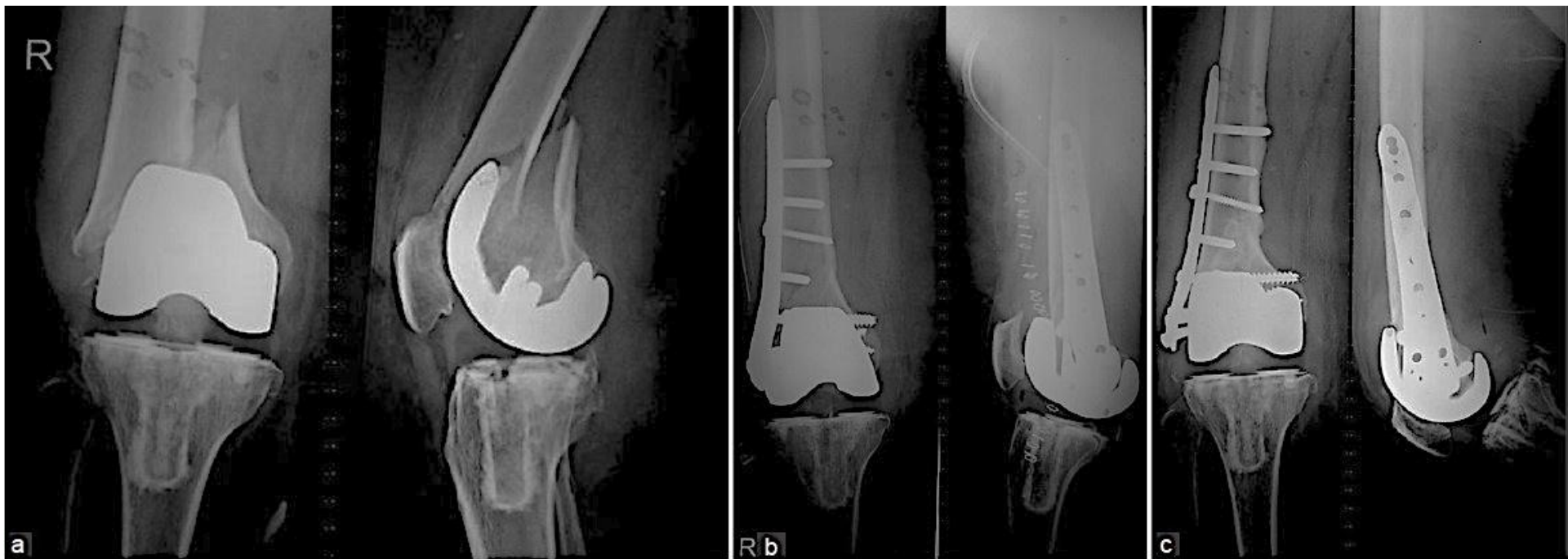


Fig. 4-B

O.A- Complications, Peri-prosthetic



O.A- Complications, Peri-prosthetic



O.A- Complications, Peri-prosthetic



O.A- Complications, Dislocation/Subluxation



Secondary O.A

Secondary O.A- Patients at Risk

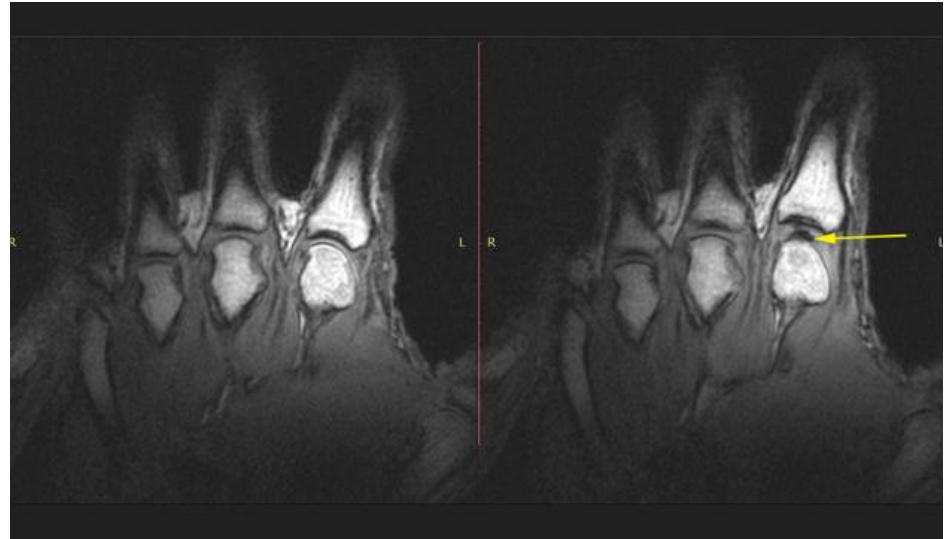
- Abnormal loads/stresses on the joint:
 - Obesity
 - Deformity → ex: # malunion
 - Incongruity:
 - Intra-articular #
 - Acetabular dysplasia (A.D) → as in DDH or Perthes
 - AVN → SCA, Perthes, SCFE
 - Instability → soft tissue trauma (ACL, meniscal tear, ...)
- Rheumatoid disorders (Rh.A, psoriasis, ...)
- Septic arthritis
- Occupation of repetitive stresses:
 - Professional athletes → baseball pitchers, football, ...
 - Ballet dancers → big toe O.A
 - Workers of heavy vibrating tools → O.A of U.L
 - Cotton mill workers/secretaries → hand O.A
 - Manual workers → even spine O.A
 - L.L.D
- Familial

Secondary O.A- Patients at Risk

Cracking joints ...



Secondary O.A- Patients at Risk



2nd O.A- Patients at Risk

The digital era ...



Any Question ?

Remember

Take Home Message

- O.A will develop eventually... take precautions
- A person → best is prevention
- As Dr's → we strive to prevent secondary O.A
- Conservative treatment is an important part
- Not all O.A joints needs surgery
- If surgery is indicated which components is/are needed



Lecture Objectives

- Definition
- Types → primary & secondary
- Grades → mild, moderate, severe
- Clinical picture
- Workup
- Radiological assessment
- Treatment
 - Conservative
 - Minimally invasive
 - Operative
- Complications
- Secondary O.A causes & patients at risk